

A BIBLIOGRAPHY OF ANOMALIES
OF FISHES

Supplement 2

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This listing adds 213 titles to the original bibliography (Gulf Res. Repts. 1(6), 1964) and the 1966 supplement (Gulf Res. Repts. 2(2):169-176). Although a number of previously overlooked references are included, there are 137 citations of works published during the 1965-70 period. The frequency of recent publications offers some indication of the current worldwide interest in problems of fish teratology.

Apparently in response to increased interest in the environment, some American authors are now attempting to relate anomalies in natural or "wild" populations of fishes to pollution levels. While this may be a useful area of investigation, the results should be evaluated with caution. It is obvious that only sub-lethal conditions are observed and there are few data, especially in marine or estuarine environments, upon which to establish a "normal" survival potential for a particular abnormality in any species. Those hoping to use published records to establish a "base-line" should bear in mind that, with few exceptions, both old and recent publications report only the most obvious and striking conditions (macro-anomalies). Investigators attempting to determine frequencies of abnormalities should include data on the less obvious and possibly very common micro-anomalies.

This supplement includes an Index of Sources and Abbreviations covering those journals not included in the original bibliography. As in the previous supplement, titles are serially numbered and prefixed by the letter "S"; the prefix has been omitted from the index listings. Corrections to be made in the original bibliography are indicated under Corrigenda.

I again wish to express my continuing appreciation to those colleagues who have provided reprints of their papers or otherwise contributed to this bibliography.

BIBLIOGRAPHY

- S-92 Acara, A. H. 1968. A normal, synchronous hermaphrodite Dolly Varden char. Trans. Amer. Fish. Soc. 97 (2) :201-202, fig.
- S-93 Amin, O. M. 1968. Deformed individuals of two species of suckers, *Catostomus insignis* and *C. clarkii*, from the Gila river system. Copeia 1968(4) :862-863.
- S-94 Anon. 1968. *Xiphophorus maculatus* (Gunter). Pearl albino platy. Trop. Fish Hobbyist 17(4) :33-34, 3 figs.
- S-95 Anwand, K. 1963. Über einige Abnormitäten und Missbildungen beim Hering (*Clupea harengus* L.). Z. Fisch. 11(7/8) :533-538.
- S-96 Arme, C. 1965. A hermaphrodite specimen of roach, *Rutilus rutilus* (L.). Proc. Leeds phil. lit. Soc. 9(11) :277-281, 2 figs.
- S-97 Atz, J. W., Kallman, K. D., and Nigrelli, R. F. 1963. Position effect as a factor in the production of melanosis and melanoma in the fish *Xiphophorus*. Proc. int. Congr. Zool. 16(2) :206.
- S-98 Bakhshi, P. L. and Saxena, D. B. 1966. Observations on an abnormal shark, *Scoliodon walbeehmi* Blkr. Proc. nat. Acad. Sci. India, Sect. B. (Biol. Sci.) 36(1) :85-88, 5 figs.
- S-99 Bapat, S. V. and Radhakrishnan, N. 1968. A note on the occurrence of abnormal specimens of mackerel, *Rastrelliger kanagurta* (C.) on the Karwar coast. J. Mar. biol. Ass. India 1966, 8(1/2) :363-364, fig.
- S-100 Bartholomew, M. A., DiVall, J., and Morrow, J. E. 1962. Silver pike, an atypical *Esox lucius*, in Alaska, a first record. Copeia 1962(2) :449-450.
- S-101 Baruah, M. C. 1968. A case of albinism in *Heteropneustes fossilis* (Bloch). J. Bombay nat. Hist. Soc. 65:495-496.
- S-102 Bastos, J. R. 1965. Um caso anômalo em *Scomberomorus maculatus* (Mitchill). Arq. Estac. Biol. mar. Univ. Ceará 5(2) :215.
- S-103 Beamish, R. J. 1969. Asymmetry in the trunk vertebrae of *Lota lota lacustris* (Walbaum). Canad. J. Zool. 47 (4) :537-538.
- S-104 Benl, G. and Sterba, G. 1964. Über einen merkwürdigen Fall doppelseitiger, partieller Mehrfachbildung bei *Protopterus dolloi* Blgr. (Pisces, Dipnoi). Zool. Anz. 173:360-363, 2 figs.

- S-105 Bennet, P. S. 1964. On an abnormal ray from Vizhin-gam (*Rhynchobatus djiddensis*). J. Mar. biol. Ass. India 6(2) :316-317, fig.
- S-106 Bensam, P. 1964. On certain gonadal abnormalities met with in the Indian oil sardine *Sardinella longiceps* Va. J. Mar. biol. Ass. India 6(1) :135-141.
- S-107 _____ 1965a. Regeneration of the caudal fin in the Indian oil sardine, *Sardinella longiceps* Valenciennes. J. Mar. biol. Ass. India 7(1) :102-107, 12 figs.
- S-108 _____ 1965b. On a freak embryo of the grey shark, *Carcharhinus limbatus* Müller and Henle. J. Mar. biol. Ass. India 7(1) :206-207, 4 figs.
- S-109 Berland, B. 1967. A melanistic herring. Fauna, Oslo 20(4) :273-274.
- S-110 Böhlke, J. E. 1956. A new pigmy sunfish from southern Georgia. Notul. nat. Acad. Philad. 294:1-11, 2 figs.
- S-111 Brady, L. E., Hulsey, A. H. and Watson, M. E. 1962. Pied channel catfish - a color mutation. Proc. Conf. Southeast. Ass. Game Commrs. 16:360.
- S-112 Breder, C. M., Jr. 1927a. The fishes of the Rio Chucun-aque drainage, eastern Panama. Bull. Amer. Mus. nat. Hist. 57(3) :91-176.
- S-113 _____ 1927b. Tailless pearl roach. Bull. N. Y. zool. Soc. 28(3) : 72-74.
- S-114 _____ 1953. An ophichthid eel in the coelom of a sea bass. Bull. N. Y. zool. Soc. 38(18) :201-202.
- S-115 Brian, A. 1952. Caso mostruoso di un pesce privo di un occhio (*Merluccius esculentus* Risso). Natura, Milano 43:17-23, 2 figs.
- S-116 Briggs, P. T. 1966. A pugheaded tautog. N. Y. Fish Game J. 13(2) :237.
- S-117 Brown, C. J. D. 1962. An injured big skate, *Raja binocu-lata*. Proc. Mont. Acad. Sci. 22:93-94.
- S-118 _____ and Fox, A. C. 1966. Mosquito fish (*Gambusia affinis*) in a Montana Pond. Copeia 1966(3) : 614-616.
- S-119 Bullough, W. S. 1940. A case of hermaphroditism in the herring (*Clupea harengus*, Linn.). Proc. Leeds phil. lit. Soc. 3:638-641.
- S-120 Carufel, L. H. 1966. A three-headed trout. Progr. Fish. Cult. 28(1) :50, fig.

- S-121 Carvalho, J. de P. 1946. Sobre 2 casos de deformacao gular de peixes. Caca e Pesca 5(57) :28-30.
- S-122 Cavaliere, A. 1965. Anomalie della colonna vertebrale in *Boops salpa* L. Boll. Pesca Pisci. Idrobiol., n. s., 20 (1) :52-59, 5 figs.
- S-123 Chacon, J. O. 1954. Caso de hermafroditismo em curimata comum, "Phochilodus sp."-(Actinopterygii, Characidae, Phochilodinae). Publ. Serv. Piscic. Bras. 163: 1-19.
- S-124 Chidester, F. E. 1917. Hermaphroditism in *Fundulus heteroclitus*. Anat. Rec. 12:389-398.
- S-125 Ciechomski, J. D. de and Christiansen, H. E. 1968. Un caso de hermafroditismo en la merluza *Merluccius merluccius hubbsi* (Pisces, Merlucciidae). Physis, B. Aires 27(75) :423-428, 9 figs.
- S-126 Cohen, D. M. and Torchio, M. 1964. Comments on the identity of the Mediterranean fish *Strijsia tinea*. Ann. Mag. nat. Hist., 13th ser., 6(67) :389-390.
- S-127 Comfort, A. and Doljanski, F. 1958. The relation of size and age to rate of tail regeneration in *Lebiasina reticulatus*. Gerontologia 2(5) :266-283.
- S-128 Compagno, L. J. V. 1967. Tooth pattern reversal in three species of sharks. Copeia 1967(1) :242-244, 2 figs.
- S-129 Conrad, J. F. and Decew, M. 1967. Observations on deformed juvenile coho salmon. Res. Briefs 13(1) :129.
- S-130 Crane, J. M., Jr. 1967. Albinoid coloring in a sand bass, *Paralabrax nebulifer* (Girard). Calif. Fish Game 53 (3) :217-218, fig.
- S-131 Dahlberg, M. D. 1970. Frequencies of abnormalities in Georgia estuarine fishes. Trans. Amer. Fish. Soc. 1970 (1) :95-97.
- S-132 Daly, R. J. 1970. Systematics of southern Florida anchovies (Pisces: Engraulidae). Bull. Mar. Sci. 20 (1) : 70-104, 6 figs.
- S-133 Danielssen, D. and Tveite, S. 1968. Tagged saithe (*Gadus virens*). Fauna, Oslo 21:137, 2 figs.
- S-134 Davenport, D. 1966. Colour variant of bocaccio (*Sebastodes paucispinis*) in British Columbia waters. J. Fish. Res. Bd. Can. 23(12) :1981.
- S-135 Dawson, C. E. 1967a. Notes on teratological gobioid fishes from Louisiana and Maryland. Proc. La. Acad. Sci. 30:74-79, 3 figs.

- S-136 ——— 1967b. Three new records of partial albinism in American heterosomata. *Trans. Amer. Fish. Soc.* 96(4) :400-404, 6 figs.
- S-137 ——— 1968. An adventitious dorsal fin-ray in *Microgobius gulosus* (Pisces:Gobiidae). *Anat. Anz.* 122: 498-501, 2 figs.
- S-138 ——— 1969a. Three unusual cases of abnormal coloration in northern Gulf of Mexico flatfishes. *Trans. Amer. Fish. Soc.* 98(1) :106-108, 2 figs.
- S-139 ——— 1969b. *Citharichthys abbotti*, a new flatfish (Bothidae) from the southwestern Gulf of Mexico. *Proc. biol. Soc. Wash.* 82:355-372, 7 figs.
- S-140 ——— 1969c. Records of the barnacle *Conchoderma virgatum* from two Gulf of Mexico fishes. *Proc. La. Acad. Sci.* 32:58-62, fig.
- S-141 Denoncourt, R. F. and Bason, W. H. 1970. Blind striped bass, *Roccus saxatilis* (Walbaum) from the Delaware River Estuary. *Chesapeake Sci.* 11(2) :132-134, fig.
- S-142 Dhulkhed, M. H. 1965. On an unusual ovary of the Indian oil sardine *Sardinella longiceps* Val. *J. Mar. biol. Ass. India* 7(1) :210-211, fig.
- S-143 D'Ombrain, A. 1957. Game fishing off the Australian coast. Angus and Robertson, Sydney, xviii+230 pp.
- S-144 Drapkin, Y. I. 1968. [A deformity of the sole *Solea lascaris nasuta* (Pallas) from the Black Sea.] *Vop. Ikh-tiol.* 8(2) :362, fig.
- S-145 Dryfoos, R. L. 1966. The life history and ecology of the longfin smelt in Lake Washington. *Contr. Sch. Fish. Univ. Wash.* 212:36-37.
- S-146 Duffy, J. M. 1968. Deformed lateral line in a jack mackerel, *Trachurus symmetricus* (Ayres). *Calif. Fish Game* 54(4) :306, fig.
- S-147 Duijn, C. van, Jr. 1967. Diseases of fishes. Illiffe Books Ltd., London. 309 p.
- S-148 Easwaran, C. R. 1968. On an abnormal ray from the Gulf of Kutch. *J. Mar. biol. Ass. India*, 1967, 9(1) : 198-200, 2 figs.
- S-149 Edsall, T. A. and Saxon, M. I. 1968. Two hermaphroditic alewives from Lake Michigan. *Copeia* 1968(2) : 406-407, 2 figs.
- S-150 Essenberg, J. N. 1923. Complete sex-reversal in the viviparous teleost *Xiphophorus helleri*. *Biol. Bull., Woods Hole* 45:46-96.

- S-151 Fischer, J. L. 1965. On a malformation in the guppy (*Lebistes reticulatus*). Bull. mens. Soc. linn. Lyon 34 (8) :339-340, 2 figs.
- S-152 Follett, W. I. 1952. Annotated list of fishes obtained by the California Academy of Sciences during six cruises of the U. S. S. MULBERRY, conducted by the United States Navy off central California in 1949 and 1950. Proc. Calif. Acad. Sci., ser. 4, 27 (16) : 399-432, 6 pls.
- S-153 _____ and Dempster, L. J. 1966. Partial melanobinism in a scorpaenid fish, *Sebastodes melanostomus* Eigenmann and Eigenmann, from Monterey Bay, California, with selected references to melanism and albinism in fishes. Wasmann J. Biol. 24(2) :189-198, pl.
- S-154 Forster, G. R. 1967. A note on two rays lacking part of the snout. J. Mar. biol. Ass. U. K. 47(3) :499-500, fig., 2 pls.
- S-155 Fowler, H. W. 1912. Hermaphrodite shad in the Delaware. Science, n. s., 36:18-19.
- S-156 Frank, S. 1968. Vergetarier unbeliebt? Aquar. Mag. 2: 18-19, 4 figs.
- S-157 Freund, L. 1909. Hermaphroditismus bei *Clupea harengus*. S. B. 'Lotos' 57:97-98.
- S-158 Fulmer, B. A. and Ridenhour, R. L. 1967. Jaw injury and condition of king salmon. Calif. Fish Game 53(4) : 282-285, 2 figs.
- S-159 Fuster de Plaza, M. L. and Boschi, E. E. 1957. Desnutricion y deformaciones vertebrales en pejerreyes de los embalses de Cordoba. Rep. Argentina, Ministerio de Agricultura y Ganaderia, Dept. Invest. Pesqueras, B. Aires. 39 p., illus.
- S-160 Geyer, F. 1940. Abnorme Seitenlinien bei Fischen. Z. Fisch. 38:221-254.
- S-161 Gill, C. D. and Fisk, D. M. 1966. Vertebral abnormalities in sockeye, pink and chum salmon. Trans. Amer. Fish. Soc. 95 (2) :177-182, 11 figs.
- S-162 Godói, M. P. 1947. Um caso de separacao entre as eburas genital e anal na piava-ussu, "*Leporinus*" sp. Rev. bras. Biol. 7(3) :307-309, fig.
- S-163 Goodwin, W. F. and Vaughn, T. L. 1968. An adult pug-headed American shad *Alosa sapidissima*. Trans. Amer. Fish. Soc. 97(1) :50, fig.

- S-164 Gorman, T. B. and Dunstan, D. J. 1967. Report on an attack by a great white shark off Coledale Beach, N. S. W., Australia, in which both victim and attacker were recovered simultaneously. Calif. Fish Game 53 (3) :219-223, 3 figs.
- S-165 Goss, R. J. 1956. An experimental analysis of taste barbel regeneration in the catfish. J. exp. Zool. 131:27-50.
- S-166 _____ and Stagg, M. W. 1957. The regeneration of fins and fin rays in *Fundulus heteroclitus*. J. exp. Zool. 136(3) :487-507.
- S-167 Grimaldi, E. 1965. Frequenza delle malformazioni nella popolazione di coregone bondella (*Coregonus* sp.) del Lago Maggiore. Mem. Ist. Ital. Idrobiol. de Marchi 19 (1) :93-99.
- S-168 Grimpe, G. 1927. Über eine merkwürdige Zwitтерgonade des Herings (*Clupea harengus*). S. B. naturf. Ges. Lpz. 1926:60-70.
- S-169 Gudger, E. W. 1922. Foreign bodies found embedded in the tissues of fishes. Nat. Hist., N. Y. 22(5) :452-457.
- S-170 _____ 1928. A mackerel (*Scomber scombrus*) with a rubber band rove through its body. Amer. Mus. Novit. 310:1-6.
- S-171 Gunstrom, G. K. 1966. The occurrence of a katadidymus chinook salmon alevin. Trans. Amer. Fish. Soc. 96(2) : 214-216, 2 figs.
- S-172 Hansen, D. J. 1969. Vertebral anomaly in *Micropogon undulatus*. Quart. J. Fla Acad. Sci. 31(3) :207-208, fig.
- S-173 Hase, A. 1935. Über ein hypertrophisches Flossenregenerat beim Goldfisch *Carassius auratus* L. S.B. Ges. naturf. Fr. Berl. 1935:288-289.
- S-174 Hashmi, S. S. 1966. Colour variation: sex ratio and size frequency of *Otolithus argenteus* (Cuvier), (Silver-banded jew fish). Pakist. J. Sci. indust. Res. 9:283-285, fig.
- S-175 Hass, G. 1936. Variationsstatistische Untersuchungen an Proben von *Gobius microps* Krøyer aus der Kieler Bucht und der Schlei. Schr. naturw. Ver. Schlesw.-Holst. 21(3) :419-426.
- S-176 Herald, E. S. 1941. First record of the hybrid flounder, *Inopsetta ischyra*, from California. Calif. Fish Game 27(2) :44-46, fig.

- S-177 Hikita, T. 1965. Some cases of the anomalous coloration of the pink salmon, *Oncorhynchus gorbuscha* (Walbaum), caught in the north Pacific Ocean. Sci. Rep. Hokkaido Salm. Hatch. 19:75-77.
- S-178 Hildebrand, S. F. 1946. A descriptive catalog of the shore fishes of Peru. Bull. U. S. nat. Mus. 189:xi+1-530.
- S-179 Hillis, J. P. 1966. Abnormal thornback ray, *Raja clavata*, from Co. Kerry. Irish Nat. J. 15(6):182.
- S-180 Hoeck, P. P. C. 1894. Die op een hermaphrodiot exemplaar van de rog (*Raja clavata*) betrekking hebben. Tijdschr. ned. dierk. Ver., ser. 4, 2:45-46.
- S-181 Hoff, F. H., Jr. 1969. Ambicoloration of an adult flounder, *Paralichthys alboguttatus*. Copeia 1969(1):208-209, 2 figs.
- S-182 Hoff, J. G. 1970. Vertebral anomalies in a humpbacked specimen of Atlantic silverside, *Menidia menidia*. Chesapeake Sci. 11(1):64-65.
- S-183 Honma, Y. and Kitami, T. 1967. Notes on a peculiar spinal curvature in the file fish, *Noradon modestus*, from the Sea of Japan. Bull. Jap. Soc. sci. Fish. 33(1):20-23, pl.
- S-184 _____ and Mizusawa, R. 1965. Record of a specimen of an orange-red (xanthochroic) flounder, *Micromesistius achne* (Jordan and Starks) from off Nohmachi, Sea of Japan. Collect. & Breed. 27(12):452-453, fig.
- S-185 Hourston, A. S. 1968. Abnormal cessation of growth in a herring otolith. J. Fish. Res. Bd. Can. 25(11):2503-2504, pl.
- S-186 Hubbs, C. L. 1919. Records of abnormal variations among fishes. Copeia 70:45-46.
- S-187 _____ 1927. The related effects of a parasite on a fish. J. Parasit. 14(2):75-84.
- S-188 _____ 1936. Fishes of the Yucatan Peninsula. Publ. Carnegie Instn. 457:157-287, 16 pls.
- S-189 Huet, M. 1970. Traité de Pisciculture, 4th edn. Ch. de Wyngaert, Brussels, xxiii+713p.
- S-190 Hulquist, R. G. 1967. First recorded xanthic sargo, *Anisotremus davidsonii* (Steindachner), from the Salton sea, California. Calif. Fish Game 53 (4): 292-293, fig.

- S-191 Huzita, S. and Nishino, K. 1966. An albino of *Sebastolobus macrochir* collected off Cape Eimo, Japan. Jap. J. Ichthyol. 13(4) :210-212, fig.
- S-192 Imai, K. 1965. Malformed caudal neurosecretory system in the eel, *Anguilla japonica*. Embryologia, Nagoya 9:78-97, 41 figs.
- S-193 Imaoka, Y. and Nishimura, S. 1964. Anomalies found in the flatfishes from the southern Japan Sea. Bull. Japan Sea Fish. Res. Lab. 13:137-140, 2 pls.
- S-194 Iredale, T. and Whitley, G. P. 1929. Captain Cook's leatherjacket. Aust. Mus. Mag. 3(12) :421-425, 4 figs.
- S-195 Ito, K. 1965. On two abnormal forms of zuwai-gani, *Chionoecetes opilio elongatus* O. Fabricus. Bull. Japan Sea Fish. Res. Lab. 14:91-93.
- S-196 Johnson, J. E. 1968. Albinistic carp, *Cyprinus carpio*, from Roosevelt Lake, Arizona. Trans. Amer. Fish. Soc. 97(2) :209-210.
- S-197 Jones, E. C., Rothschild, B. J. and Shomura, R. S. 1968. Additional records of the pedunculate barnacle, *Conchoderma virgatum* (Spengler), on fishes. Crustaceana 14(2) :194-196, 2 figs.
- S-198 Jones, S. and Patulu, V. R. 1954. A remarkable case of albinism in the freshwater eel, *Anguilla bengalensis* Gray. J. Bombay nat. Hist. Soc. 51(1) :285-287.
- S-199 King, A. D. 1966. Hermaphroditism in the common dogfish (*Scyliorhinus caniculus*). J. Zool., London 148: 312-314, fig.
- S-200 Klay, G. 1969. 1969 model of thornback ray makes showroom debut at Cleveland aquarium. Drum and Croaker 69(1) :21, fig.
- S-201 Klinger, K. 1960. Wirbelsäulenverkrümmungen bei Fischen. Schweiz. Fisch Ztg. 68(5) :101.
- S-202 Kotthaus, A. 1967. Fische des Indischen Ozeans. A. Systematischer Teil I: Isospondyli und Giganturoidei. "METEOR" Forschungsergebnisse, Reihe D, 1:1-57, 59 figs.
- S-203 Lawler, G. H. 1966a. Pugheadedness in perch, *Perca flavescens*, and pike, *Esox lucius*, of Heming Lake, Manitoba. J. Fish. Res. Bd. Can. 23(11) :1807-1808, fig.
- S-204 _____ 1966b. A second record of an accessory fin on *Esox lucius*. J. Fish. Res. Bd. Can. 23(12) :1969, fig.

- S-205 Lesnikova, T. V. 1965. [Malformations among fishes of the Gorkovskiy Reservoir.] Izv. Gos. Nauch-Issled. Inst. Ozer. Rechn. Rybn. Khoz. 59:138-142.
- S-206 Lewis, R. M. 1966. Effects of salinity and temperature on survival and development of larval Atlantic menhaden, *Brevoortia tyrannus*. Trans. Amer. Fish. Soc. 95(4) :423-426.
- S-207 Lieder, U. 1959. Über die Entwicklung bei männchenlosen Stämmen der Silberkarasche *Carassius auratus gibelio* (Bloch) (Vertebrata, Pisces). Biol. Zbl. 78:284-291.
- S-208 Lillelund, K. 1965. Weitere Untersuchungen über den Hermaphroditismus bei *Osmerus eperlanus* (L.) aus der Elbe. Z. Morph. Ökol. Tiere 55:410-424, 2 figs.
- S-209 Loeb, H. A. and Kelly, W. H. 1968. Eyelessness due to cannibalism in a population of stunted brown trout. N. Y. Fish Game J. 15(2) :197-200.
- S-210 Lüling, K. H. 1952. Ein zwittriger Pilchard. Fischereiwelt 4:46.
- S-211 Maheshwari, S. C. 1966. A case of abnormality in the testes of *Mastacembelus armatus* (Lacep.). Jap. J. Ichthyol. 14(1/3) :101-102, 2 figs.
- S-212 Malhotra, Y. R. 1968. Abnormal condition of ovaries in *Schizothorax niger* Heckel. Sci. & Cult. 34:469-470, 2 figs.
- S-213 Manion, P. J. 1967. Morphological abnormalities among lampreys. Copeia 1967(3) :680-681, fig.
- S-214 Mann, H. 1954. Die Wirtschaftliche Bedeutung von Krankheiten bei Seefischen. Fischwirtschaft 6:38-39.
- S-215 Marcoux, R. G. 1966. Occurrence of a melanistic paddlefish (*Polyodon spathula*) in Montana. Copeia 1966 (4) :876, fig.
- S-216 Marlborough, D. and Meadows, B. S. 1966. A 'pug-headed' perch (*Perca fluviatilis* L.) from the River Lea. Lond. Nat. 45:98-99, pl.
- S-217 Matsumoto, W. M., Talbot, F. H., Collette, B. B., and Shomura, R. S. 1969. Pacific bonito (*Sarda chiliensis*) and skipjack tuna (*Katsuwonus pelamis*) without stripes. Copeia 1969(2) :397-398.
- S-218 Mawdesley-Thomas, L. E. and Young, P. C. 1967. Cutaneous malanosis in a flounder (*Platichthys flesus* L.). Vet. Rec. 81:384-385, 2 figs.

- S-219 McKenzie, M. D. 1970. First record of albinism in the hammerhead shark, *Sphyrna lewini* (Pisces:Sphyrnidae). J. Elisha Mitchell sci. Soc. 86(1):35-37, fig.
- S-220 Menezes, R. S. de 1961. Ausência de nadadeiras ventrais em *Lycengraulis barbouri* Hildebrand, 1943. Bol. Soc. Cear. Agron. 2:57-58, fig.
- S-221 Menzel, R. W. 1959. Further notes on the albino catfish. J. Hered. 49(6):284, 293.
- S-222 Michajlowa, L. 1968. Missbildungen bei einigen Süßwasserfischen (Cyprinidae). Z. Fisch. 16:139-153, 16 figs.
- S-223 Millikan, A. E. and Pattie, B. H. 1970. Hermaphroditism in a Pacific hake, *Merluccius productus*, from Puget Sound, Washington. J. Fish. Res. Bd. Can. 27:409-410.
- S-224 Moe, M. A., Jr. 1966. Hermaphroditism in mullet, *Mugil cephalus* Linnaeus. Quart. J. Fla. Acad. Sci. 29(2):111-116, 2 figs.
- S-225 ——— 1968. A reversed, partially ambicolorate tongue-sole, *Sympodus diomedianus*, from the Gulf of Mexico. Copeia 1968(1):172.
- S-226 Monteiro, F. P. 1965. Casos de "albinismo" em cascudo preto (*Rhinolepis aspera* Agassiz) no Rio Piracicaba. An. Congr. Lat.-Amer. Zool. 2:199-202, 3 figs.
- S-227 Moore, D. 1969. A reversed southern flounder, *Paralichthys lethostigma* Jordan and Gilbert, from the Gulf of Mexico. Tex. J. Sci. 21(1):97-99, fig.
- S-228 Moore, G. A. and Curd, M. R. 1966. A pinhole camera eye in the white crappie, *Pomoxis annularis*. Copeia 1966(2):359-360, fig.
- S-229 Müller, K. 1953. Die Schuppenmissbildungen bei der Torelle *Salmo trutta* L. und eine Deutung dieser Erscheinung. Rep. Inst. Freshw. Res. Drottning. 1952:78-86, 6 figs.
- S-230 Musick, J. A. and Hoff, J. G. 1968. Vertebral anomalies in humpbacked specimens of menhaden, *Brevoortia tyrannus*. Trans. Amer. Fish. Soc. 97(3):277-278, 2 figs.
- S-231 Nakatsukasa, Y. 1965. An example of the hermaphroditic gonad found in *Oncorhynchus keta* (Walbaum). Jap. J. Ichthyol. 13(1/3):59-63, 2 figs.
- S-232 Nayak, P. D. 1959. Occurrence of hermaphroditism in *Polynemus heptadactylus* Cuv. & Val. J. Mar. biol. Ass. India 1(2):257-258, fig.

- S-233 Nichols, J. T. 1921. The Miami aquarium. Nat. Hist., N. Y. 21(4) :359.
- S-234 Norton, J. 1968. Piebald hi-fin swordtail. Trop. Fish Hobbyist 16(5) :4-13, 11 figs.
- S-235 Okiyama, M. 1965. [A case of pugheadedness in the rock fish, *Sebastes oblongus* Günther.] Bull. Japan Sea Fish. Res. Lab. 14:85-89, 2 figs.
- S-236 Paris, J. and Quignard, J.-P. 1968. Quelques cas d'ambicoloration et d'albinisme chez *Solea vulgaris* Quensel. Rev. Trav. Inst. Pêch. marit. 32:507-510, 4 figs.
- S-237 Patnaik, S. 1967. Hermaphroditism in the Indian salmon *Eleutheronema tetradactylum* (Shaw). Curr. Sci. 36(19) :525.
- S-238 Patten, B. G. 1966. An abnormally colored C-O sole, *Pleuronichthys coenosus*. Underw. Nat. 1(1) :40, 2 figs.
- S-239 _____ 1968. Abnormal freshwater fishes in Washington streams. Copeia 1968(2) :399-401.
- S-240 Penczak, T. 1967. An example of *Blicca bjoerena* (L.) deprived of pectoral fins and pelvic girdle. Przegl. Zool. 11:363-364, 2 figs.
- S-241 Pener-Salomon, H. 1969. Atypical optic papillae in *Barbus canis* (Cyprinidae, Pisces). Israel J. Zool. 18:255-262, 4 figs.
- S-242 Pflugfelder, O. 1967. Weitere Untersuchungen über Kypholordose und Scoliose nach Zerstörung der Epiphysenregion bei Fischen und Haushühnern. Roux Arch. EntwMech. Org. 158:170-187, 19 figs.
- S-243 Phillips, J. B. 1952. Yellow sablefish (black cod) taken in Monterey Bay. Calif. Fish Game 38(3) :437-439, fig.
- S-244 _____ 1957. A review of the rockfishes of California (family Scorpaenidae). Fish Bull., Sacramento 104: 1-158, 67 figs.
- S-245 _____ 1964. Life history studies on ten species of rockfish (genus *Sebastodes*). Fish Bull., Sacramento 126:1-70, 35 figs.
- S-246 Pinto, J. dos S. 1953. Um caso de hermafroditismo em *Sardina pilchardus* (Walb.). Notas Estud. Inst. Biol. marit. 5:1-5.
- S-247 Plehm, M. 1924. Praktikum der Fischkrankheiten. E. Schwiezerbart'sche Verlagsbuchhandlung, Stuttgart, 179 p.

- S-248 Prabhakara Rao, A. V. 1969. A case of hermaphroditism with notes on two abnormal ovaries in the silver biddy, *Gerres oyena* (Forskål) from the Pulicat Lake. J. Mar. biol. Ass. India 1967, 9(2) :339-345, 2 figs.
- S-249 Prawochenski, R. 1966. Anomaly in the structure of the skeleton in *Chondrostoma nasus* (L.) from the Vistula river. Przegl. Zool. 10:415, fig.
- S-250 Radulescu, I. 1965. Deformari prin traumatisme constatare la calcanul [*Scophthalmus maeoticus* (Pallas)] din Marea neagra. Bul. Inst. Cerc. pisc. 24(3-4) :108-112, 2 figs.
- S-251 _____ 1967. Exosteze pe spinul hemal *Pagrosomus auratus*. Bul. Inst. Cerc. pisc. 26(4) :82-84, fig.
- S-252 _____ and Iliescu, M. 1964. Brahnagatie si anoftalmie la salau *Stizostedion lucioperca* (L.). Bul. Inst. Cerc. pisc. 23(4) :97-100, 2 figs.
- S-253 _____ and Nalbant, T. T. 1969. Cazuri de brachignatie la unele Gadidae si Zoarcidae din oceanul Atlantic de nord—vest. Bul. Inst. Cerc. pisc. 28(1) :81-84, 4 figs.
- S-254 Rajapandian, M. E. and Sundaram, K. S. 1968. A case of complete albinism in the marine cat-fish *Trachysurus dussumieri* (Cuvier and Valenciennes). J. Mar. biol. Ass. India 1967, 9(1) :194-195.
- S-255 Raney, E. C. 1952. The life history of the striped bass, *Roccus saxatilis* (Walbaum). Bull. Bingham oceanogr. Coll. 14:5-97.
- S-256 Rangarajan, K. 1968. On an instance of reduced number of anal spines in *Scolopsis phacops* (Bennett) (Scolopidae-Pisces). J. Mar. biol. Ass. India, 1966, 8(1/2) : 369-370.
- S-257 Reed, M. 1968. Bent spine. Trop. Fish Hobbyist 16(5) : 85-87, 2 figs.
- S-258 Rees, E. I. S. 1965. A deformed thornback ray. Nat. in Wales 9:227-228, fig.
- S-259 Reichenbach-Klinke, H. 1958. Ein Barsch mit "Mopskopf". Nachr. naturw. Mus. Aschaffenburg 61:85-88.
- S-260 _____ 1966. Krankheiten und Schädigungen der Fische, Gustav Fischer Verlag, Stuttgart, xii+389 p.
- S-261 Reimers, P. E. and Bond, C. E. 1966. Occurrence of the *Bidens* (sp.) achene in the snout of chinook salmon and redside shiners. Progr. Fish Cult. 28(1) :61, fig.

- S-262 Rose, C. D. and Harris, A. H. 1968. Pugheadedness in the spotted seatrout. Quart. J. Fla. Acad. Sci. 31(4) : 268-270, fig.
- S-263 Rothschild, B. J. 1966. Observations on the alewife (*Alosa pseudoharengus*) in Cayuga Lake. N. Y. Fish Game J. 13(2) :188-195.
- S-264 Schäferna, K. 1934. Karpfen und Barsch mit abnorm verlängerten Flossen. Z. Fisch. 32:375-379.
- S-265 Schwartz, F. J. 1963. Bluefish from Chesapeake Bay deformed by plastic band. Chesapeake Sci. 4(4) :196, fig.
- S-266 Seshappa, G. 1966. On a case of reversal in *Cynoglossus semifasciatus* Day. J. Mar. biol. Ass. India 6(2) :319-320.
- S-267 Shrivastava, S. S. 1968. Hermaphroditism in a teleost, *Notopterus notopterus* (Pallas). Curr. Sci. 37(17) : 496-498, 2 figs.
- S-268 Shulyak, G. S. 1965. Effect of temperature on the development of abnormalities in the carp intestine. Gidrobiol. Zh., Kiev 1(4) :39-47.
- S-269 Sindermann, C. J. 1966. Diseases of marine fishes. Advan. Mar. Biol. 4:1-89, 17 figs.
- S-270 Sivaprakasam, T. E. 1966. Ambicolouration in two species of flatfishes from Madras. J. Bombay nat. Hist. Soc. 63 :758-759, 2 figs.
- S-271 Smith, B. G. 1942. The heterodontid sharks: the natural history, and external development of *Heterodontus japonicus* based on notes and drawings by Bashford Dean. Dean Memor. Vol., Amer. Mus. nat. Hist. 8: 651-770, 8 pls.
- S-272 Sriramachandra Murty, V. 1969. Notes on hyperostosis in the fish *Drepane punctata* (Linnaeus). J. Mar. biol. Ass. India 1967, 9(2) :323-326, pl.
- S-273 Starks, E. C. 1913. The fishes of the Stanford expedition to Brazil. Leland Stanford Jr. Univ. Publ., Univ. Ser., 1913 :1-77, 16 pls.
- S-274 Swan, M. A. 1968. Double-mouth deformity in a trout (*Salmo trutta*) and its cause. J. Zool., London 156(4) : 449-455, 2 figs.
- S-275 Takeuchi, K. 1960. A study of the mutant (wavy) in the medaka, *Oryzias latipes*. Annot. zool. jap. 33(2) :124-131, 8 figs.

- S-276 ————— 1966. "Wavy-fused" mutants in the medaka, *Oryzias latipes*. Nature, Lond. 211(5051) :866-867, fig.
- S-277 Talbot, G. B. 1967. Teratological notes on striped bass (*Morone saxatilis*) of San Francisco Bay. Copeia 1967 (2) :459-461, 3 figs.
- S-278 Tandon, K. K. 1965. Absence of the right pelvic in *Channa punctatus* (Bloch). Res. Bull. Punjab Univ. Sci. 15: 351-352, fig.
- S-279 ————— 1966. Ovarian abnormality in *Channa punctatus* (Bloch). Res. Bull. Punjab Univ. Sci. 17:205-206, fig.
- S-280 Tatarko, K. E. 1965. A study of the regeneration of the abdominal fins of the carp in conjunction with their anomalies. Vop. Ikhtiol. 5(2) :315-328, 2 figs.
- S-281 ————— 1966a. Deformities in the gudgeon (*Gobio gobio* L.). Vop. Ikhtiol. 6(3) :572-575, illus.
- S-282 ————— 1966b. Anomalies of the carp and their causes. Zool. Zh. 45(12) :1826-1834, illus.
- S-283 Templeman, W. 1970. Vertebral and other meristic characteristics of Greenland halibut, *Reinhardtius hippoglossoides*, from the northwest Atlantic. J. Fish. Res. Bd. Can. 27(9) :1549-1562.
- S-284 Thomas, P. T. and Raju, G. 1964. Gonadal abnormalities in scombrid fishes. Symp. Scombrid Fishes. Mar. biol. Ass. India (ser. 1), 2:719-724, 10 figs.
- S-285 Tibaldi, E. 1966. Un caso teratologico in *Diplodus vulgaris* (Geoffr.) (Pisces, Sparidae). Ann. Mus. Stor. nat. Genova 4(169) :1-3, fig.
- S-286 Tomiyama, I. 1966. On the caudal fin of a serranid fish, *Holanthias chrysostictus* (Günther). Jap. J. Ichthyol. 13(4/6) :188-189, fig.
- S-287 Torchio, M. 1966. Su alcuni *Onos* (Risso) dei mari d'Italia (Osteichthyes Gadiformes). Natura, Milano 57(3) :165-172, 5 figs.
- S-288 Townsley, P. M. and Hughes, M. L. 1963. Early stages in the recovery to injury in the dorsal fin of the Atlantic cod (*Gadus morhua*). J. Fish. Res. Bd. Can. 21(2) : 347-354.
- S-289 Trilles, J. P. 1964. Morphological change in the skull of the teleosts, Sparidae and Centracanthidae, in relation to the existence on these fish of certain Cymothoidae parasites. Ann. Parasit. hum. comp. 39:627-630.

- S-290 Unger, F. 1956. Bei *Limia melanogaster* beobachtete Geschlechtsumwandlung. Aquar.-u. Terrar. Z. 9:308.
- S-291 Valentine, D. W. and Bridges, K. W. 1969. High incidence of deformities in the serranid fish, *Paralabrax nebulifer*, from southern California. Copeia 1969(3) : 637-638.
- S-292 Vayssiere, A. and Quintaret, G. 1914. Sur un cas d'hermaphroditisme d'un *Scyllium stellare* L. C. R. Acad. Sci., Paris 158:2013-2014.
- S-293 Veen, J. F. de 1969. Abnormal pigmentation as a possible tool in the study of the populations of the plaice (*Pleuronectes platessa* L.). J. Cons. 32(3) :344-383, 22 figs.
- S-294 Venugopala Pillai, S. 1968. A note on the morphological irregularities in the Indian oil-sardine, *Sardinella longiceps* Val. J. Mar. biol. Ass. India 1967, 9(1) :195-196, fig.
- S-295 Volodin, V. M. 1960. Effect of temperature on the embryonic development of the pike, the blue bream (*Abramis ballerus* L.) and the white bream (*Blicca bjoerkna* L.). Trud. Inst. Biol. Vodokhr. 3:231-237.
- S-296 Warlen, S. M. 1969. Additional records of pugheaded Atlantic menhaden *Brevoortia tyrannus*. Chesapeake Sci. 10(1) :67-68, 2 figs.
- S-297 Whitley, G. P. 1964. Presidential Address—A survey of Australian Ichthyology. Proc. Linn. Soc. N. S. W. 89 (1) :11-127.
- S-298 Wunder, W. 1950. Verdoppelung und Verdreifachung der Enden der Kiemenblättchen beim Karpfen. Zool. Anz. 145:225-230.
- S-299 _____ 1962. Missbildung des Unterkiefers beim Karpfen. Fischwirt. 12(8) :231-235.
- S-300 _____ 1964. Doppelbildung der Brustflosse und des Schultergürtels auf einer Seite nach einer Schnittverletzung beim Hecht (*Esox lucius* L.). Roux Arch. Entw-Mech. Organ. 155:1-8, 4 figs.
- S-301 _____ 1968. Hochrückigkeit beim Aal (*Anguilla anguilla* L.), bedingt durch Wirbelsäulenverkürzung. Biol. Zbl. 87:323-331, 8 figs.
- S-302 Zieller, W. 1968. *Hippocampus Hippocampus erectus erectus*. Drum and Croaker 68(2) :23, 2 figs.

- S-303 Ziemiankowski, B. W. 1954. Ein Fall von Zwitterbildung beim Waxdick (*Acipenser guldenstaedti* Brandt). *Z. Fisch.* 3:235-236.
- S-304 Zorach, T. 1970. Gill cover deformity in eastern johnny darter, *Etheostoma olmstedi* (Percidae). *Chesapeake Sci.* 11(1):65-66.

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INDEX OF SOURCES AND ABBREVIATIONS

- Acta biol. cracov. Zool.—Acta Biologica cracoviensia. Kraków.
- Advan. Mar. Biol.—Advances in Marine Biology. Academic Press, N. Y.
- An. Congr. Lat-Amer. Zool.—Anais do Congresso Latino-Americana de Zoologia. São Paulo.
- Ann. Fac. Sci. Univ. Dakar—Annales de la Faculté des sciences, Université de Dakar.
- Ann. Mus. Stor. nat. Genova—Annali del Museo civico di storia naturale. Genova.
- Ann. Parasit. hum. comp.—Annales de parasitologie humaine et comparée. Paris.
- Arch. Environ. Health—Archives of Environmental Health. London.
- Arch. FischWiss.—Archiv für Fischereiwissenschaft. Hamburg.
- Arq. Estac. Biol. mar. Univ. Ceará—Arquivos. Estacao de Biologia Marinha. Universidad do Ceará. Fortaleza.
- Bol. Soc. Cear. Agron.—Boletim da Sociedade cearense de agronomia. Ceará.
- Bull. Bingham oceanogr. Coll.—Bulletin of the Bingham Oceanographic Collection. New Haven, Conn.
- Bull. Cent. Etude Rech. sci., Biarritz.—Bulletin du Centre d'études et de recherches scientifiques. Biarritz.

- Bull. Mar. Sci.—Bulletin of Marine Science. Miami, Fla.
- Bull. mens. Soc. linn. Lyon.—Bulletin Mensuel de la Société Linnéenne de Lyon. Lyon.
- Bull. Misaki Mar. biol. Inst.—Bulletin of the Misaki Marine Biological Institute. Kyoto University. Kyoto.
- Bull. Pacif. Mar. Fish. Comm.—Bulletin of the Pacific Marine Fisheries Commission. Portland, Ore.
- Bull. U. S. Nat. Mus.—Bulletin of the United States National Museum, Washington, D. C.
- Caca e Pesca—Caca e Pesca. São Paulo.
- Ciênc. e Cult.—Ciência e Cultura. Revista da Sociedade Brasileira para o Progresso da Ciência. São Paulo.
- Contr. Fish Comm. Ore.—Contributions. Oregon Fish Commission. Portland, Ore.
- Contr. Sch. Fish. Univ. Wash.—Contributions. School of Fisheries. University of Washington. Seattle, Wash.
- Contr. Sci. Los Angeles Cty. Mus.—Contributions in Science. Los Angeles County Museum. Los Angeles, Calif.
- Crustaceana—Crustaceana. Leiden.
- Csl. Rybárst.—Ceskoslovenské Rybárství. Prague.
- Dopov. Akad. Nauk. ukr. RSR—Dopovidi Akademiyi nauk Ukrayins'koyi RSR. Kiev.
- Drum and Croaker—Drum and Croaker. Palos Verdes, Calif.
- Embryologia, Nagoya—Embryologia. Nagoya University. Nagoya.
- Fauna, Oslo—Fauna. Norsk Zoologisk Tidsskrift. Oslo.
- Fischereiwelt—Fischereiwelt. Hamburg.
- Fischwirtschaft—Fischwirtschaft. Bremmerhaven.
- Gerontología—Gerontología. Basel, N. Y.
- Invest. pesq.—Investigación pesquera. Barcelona.
- Israel J. Zool.—Israel Journal of Zoology. Tel Aviv.
- J. Miss. Acad. Sci.—Journal of the Mississippi Academy of Sciences. Jackson, Miss.
- J. Parasit.—Journal of Parasitology. Lancaster, Pa.
- J. Zool., London—Journal of Zoology. London.
- London Nat.—London Naturalist. London.
- Lucrar. Stat. zool. mar. Agigea—Lucrarile ale Statiei zoologice maritime 'Regele Ferdinand I' della Agigea.
- Mem. Ist. ital. Idrobiol. de Marchi—Memorie dell'Istituto Italiano di Idrobiologia Dott. Marco de Marchi. Milano.

- Nat. Wales—Nature in Wales. Orielton.
- Notas Estud. Inst. Biol. marit.—Notas e estudos do Instituto de biologia maritima. Lisbon.
- Notul. nat. Acad. Philad.—Notulae Naturae. Academy of Natural Sciences of Philadelphia. Philadelphia, Pa.
- N. Y. Fish Game J.—New York Fish and Game Journal. Albany, N. Y.
- Opusc. zool. Inst. zoosyst Univ. budapest—Opuscula Zoologica. Instuti Zoosystematici Universitatis Budapestinensis. Budapest.
- Pacific Sci.—Pacific Science. Honolulu, Hi.
- Pakist. J. Sci. indust. Res.—Pakistan Journal of Science and Industrial Research. Karachi.
- Physis. B. Aires—Revista de la Sociedad argentina de ciencias naturales. Buenos Aires.
- Proc. biol. Soc. Wash.—Proceedings of the Biological Society of Washington. Washington, D. C.
- Proc. Calif. Acad. Sci.—Proceedings of the California Academy of Sciences. San Francisco, Calif.
- Proc. Conf. stheast. Ass. Game Commrs.—Proceedings of the Annual Conference of the Southeastern Association of Game and Fish Commissioners. Columbia, S. C.
- Proc. int. Congr. Zool.—Proceedings of the International Congress of Zoology. London.
- Proc. Leeds phil. lit. Soc.—Proceedings of the Leeds Philosophical and Literary Society. Leeds.
- Proc. Mont. Acad. Sci.—Proceedings of the Montana Academy of Sciences. Missoula, Mont.
- Proc. nat. Acad. Sci. India—Proceedings of the National Academy of Sciences of India. Allahabad.
- Przegl. Zool.—Przeglad Zoologiczny. Warsaw.
- Publ. Serv. Piscic. Bras.-Publicações. Servico de piscicultura, Brasil. Fortaleza.
- Publs. Carnegie Instn.—Publications of the Carnegie Institution of Washington. Washington, D. C.
- Quart. J. Fla. Acad. Sci.—Quarterly Journal of the Florida Academy of Sciences. Tallahassee, Fla.
- Res. Briefs—Research Briefs. Oregon Fish Commission. Portland, Ore.
- Res. Bull. Punjab Univ. Sci.—Research Bulletin of the Punjab University of Science. Hoshiarpur.

- Rev. Trav. Inst. Pêche. marit.—Revue des Travaux de l'Institut des Pêches Maritimes. Paris.
- Rev. Trav. Off. Pêche. marit.—Revue des Travaux de l'Office des Pêches Maritimes. Paris.
- Schr. naturw. Ver. Schlesw.-Holst.—Schriften des Naturwissenschaftlichen Vereins für Schleswig-Holstein. Kiel.
- Scot. Fish. Bull.—Scottish Fisheries Bulletin. Edinburgh.
- Skr. Komm. Havunders.—Skrifter udg. af Kommissionen for Havundersogelser. Copenhagen.
- Texas J. Sci.—Texas Journal of Science. Houston, Tex.
- Tijdschr. ned. dierk. Ver.—Tijdschrift der Nederlandische Dierkundige Vereeniging. Leiden.
- Trav. Sebast. biol. Sta.—Trudy Sevastopol'skoi biologicheskoi stantsii Akademiya nauk SSSR.
- Trop. Fish Hobbyist—Tropical Fish Hobbyist. Jersey City, N. J.
- Trud. Inst. Biol. Vodokhr.—Trudy Instituta biologii vodokhranilishch. Akademiya nauk SSSR. Moskow.
- Underw. Nat.—Underwater Naturalist. Bulletin of the American Littoral Society. Highlands, N. J.
- Vet. Rec.—Veterinary Record. London.
- Wassman J. Biol.—Wassman Journal of Biology. San Francisco, Calif.
- Zool. Polon.—Zoologica Poloniae. Breslau.
- Zool. Zh.—Zoologicheskiy zhurnal. Moskow.

CORRIGENDA

The following corrections should be entered in the appropriate sections of the original bibliography (Gulf Res. Repts. vol. 1, no. 6).

Reference	Correction
Title 447	To read: 40(4):564-571
" 561	Change: "rav" to ray
" 681	Change date to: 1903
" 925	To read: 27:263-264
" 953	To read: myctéridoide
" 993	Add: Univ. Paris (A) 244:1-179, 26 figs.
" A 15	To read: (Cuvier)
Page 371	To read: <i>Katsuwonus pelamys</i> — 465.
" 374	Syngnathidae: add—194, 195.
" 376	Pug-head, etc.: delete—555.
" 385	Collect. & Breed.: add—saishu to siiku